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Munich, 23 October 2003

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Abstract

Method and arrangement for automatic translation of messages in a communication system

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During a call setup between a calling terminal device (EG-A) and a called terminal device (EG-B), a first selector information (SI-A) which identifies a national language determined by a calling subscriber is compared with a second selector information (SI-B)

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which identifies a national language determined by a called subscriber. If the two items of selector information (SI-A, SI-B) do not match, a translation device (TRSS, TRTT) is automatically looped into the connection by the communication system.

15

Fig 2

Description

Method and arrangement for automatic translation of messages in a communication system

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The Siemens product publication "ISDN in the Office", telecom report special edition, and the Siemens magazine COM, ISBN 3-8009-3849-9, particularly pages 58 to 66, disclose a private communication system which provides additional functions on top of switching-related functions. Such additional functions are generally referred to as service features, a large number of different service features being known in this case in particular for the communication service "voice".

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15 The increasing internationalization of telephone traffic is accompanied by an increase in the number of connections between telephone subscribers having different national languages. In the course of this development, efforts are already known aimed at facilitating communication between telephone subscribers who do not have a command of the same national language by insertion of a translation device into the connection.

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EP 0 585 480 A1, for example, discloses a method whereby translation devices are inserted in the loop between each pair of subscriber terminal devices participating in a conference call. In order to insert a translation device in the loop it is necessary to input additional information into one or more subscriber terminal devices participating in the conference call.

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30 The information which initiates the insertion of the translation devices in the loop is input upon request either by dialing a call number on the respective subscriber terminal device or by speech samples in the national language in which the respective conferee wishes to conduct the following conversation, i.e. speak and listen, in the course of the conference call.

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The object of the present invention is to specify a method and an arrangement which provides a higher level of convenience during a call between subscribers who speak different national languages.

5 This object is achieved according to the invention by the features recited in Claims 1 and 8.

A significant advantage of the method according to the invention is that a subscriber can communicate in his or her national language without any additional input of information.

Advantageous developments of the invention are specified in the subclaims.

15 An exemplary embodiment of the invention is explained in more detail below with reference to the drawing, in which:

Fig 1 shows a structure diagram for schematically representing a communication system for performing the method according to the invention

Fig 2 shows a structure diagram for schematically representing the functional units participating in the course of a call setup between subscribers

25 Important functional elements of a communication system are represented in Fig 1 with the aid of a structure diagram. The communication system shown comprises a system exchange PBX with a central controller CC which is connected to line/trunk units LTU1, LTU2, ... LTUn and a switching network SN.

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The line/trunk units LTU1, LTU2, ... LTUn contain subscriber-oriented device interfaces, such as, for example, ISDN basic accesses for digital mono- and multifunctional terminal devices, 1-channel interface modules for terminal devices such as digital voice terminal devices and switching terminal devices as well as subscriber lines for analog voice terminal devices and fax terminal devices. The figure shows by way of example an internal fax terminal device FAX1 as well as a digital voice terminal device T1 and a multifunctional terminal device M1, each of which has a dialog user interface DBO.

The line/trunk units LTU1, LTU2, ... LTUn contain line/trunk circuits which serve to provide the connection to public and/or private networks or special facilities. These are, for example, ISDN basic accesses for ISDN trunk traffic (exchange lines AL1, AL2, ... ALn) and ISDN tie-line traffic (2 channels operating at 64 kbit/s and ISDN signaling) as well as digital interface units, i.e. multiplex lines (30 channels operating at 64 kbit/s) with the operating modes trunk traffic and tie-line traffic with ISDN signaling, and tie-line traffic with channel-associated signaling.

The line/trunk units LTU1, LTU2, ... LTUn are connected to the switching network SN via, for example, four voice data multiplex channels. The exchange of messages between the line/trunk units LTU1, LTU2, ... LTUn and the controller CC takes place via a signaling channel, which is designated in the figure by the reference character HDLC, using the familiar HDLC point-to-multipoint method.

The switching network SN is preferably of modular design and consists, for example, of a non-blocking time division multiplex stage for 16 voice/data multiplex channels. If two basic modules of this type are connected together it produces a switching stage for 1024 time slots (32 multiplex channels with 32 channels each). In addition to 1-channel connections, broadband connections can also be established.

The central controller CC consists of a data processor DP, a processor for signaling control DCL, a clock generator PCG and a database DB. The components referred to are interconnected via a system bus SB, as shown in the figure. The database DB contains a text memory ROM and a selector memory RAM, display texts for a dialog user interface DBO of internal terminal devices (FAX1, T1, M1) being stored in a plurality of languages in the text memory ROM. The dialog user interface DBO can be switched to another available language by pressing a language selection key (not shown) on the terminal device (FAX1, T1, M1). The language which is set on the terminal device (FAX1, T1, M1) is stored as selector information in the selector memory RAM either temporarily until the end of the next conversation or statically until the next language selection is made by the user.

In addition to the previously mentioned components, a voice information server VMS and a text and fax server TFS are connected via the system bus SB.

The voice information server VMS offers the connected subscribers the possibility of redirecting their telephone line to personal "voice mailboxes". The incoming voice information is stored in the mailboxes in digitized form and played back in natural language upon output.

By means of the text and fax server TFS, incoming text or fax messages are stored in a personal text or fax mailbox and output on demand by the recipient.

Speech translation devices TRSS1, ... TRSSn and text translation devices TRTT1, ... TRTTn are connected to the communication system via the switching network SN. The translation devices TRTT, TRSS are connected for control purposes to the system bus SB, as shown in the figure.

The speech translation devices TRSS1 ... TRSSn serve to translate a spoken message from a source language into a desired target lan-

guage and vice versa. By means of the speech translation device TRSS1 it is possible, for example, to translate a German-language message into an English-language message and vice versa. Devices such as those disclosed in the European patent application with the publication number 585 480, for example, are used as speech translation devices TRSS1, ... TRSSn.

The text translation devices TRTT1 ... TRTTn serve to translate a text present in a source language into a desired target language. By means of the text translation device TRTT1 it is possible, for example, to translate a German-language text into an English-language text and vice versa. Devices such as those disclosed in the European patent application with the publication number 357 370, for example, are used as text translation devices TRTT1, ... TRTTn.

Fig 2 shows a schematic representation of on the one hand a communication system KS-A with a calling terminal device EG-A assigned to it and on the other hand a communication system KS-B with a called terminal device EG-B assigned to it. To simplify the explanation it is assumed that both communication systems KS-A, KS-B are structured as explained in connection with Fig 1.

In a database DB-A of the communication system KS-A there is stored in a selector memory RAM selector information SI which identifies the national language set for a display user interface DBO of an internal terminal device EG. Thus, for example, a selector information SI-A is stored in the selector memory RAM for the calling terminal device EG-A shown in the figure.

In the same way, in a database DB-B of the communication system KS-B there is stored in a selector memory RAM selector information SI which identifies the national language set for a display user interface DBO of an internal terminal device EG. Thus, for example, a selector information SI-B is stored in the selector memory RAM for the called terminal device EG-B shown in the figure. In the configuration shown, the national language German D, for example, is set for the display user interface DBO of the calling terminal device EG-A, and the national language English E for the display user interface DBO of the called terminal device EG-B.

During a call setup from the calling terminal device EG-A to the called terminal device EG-B, the selector information SI-A assigned to the calling terminal device EG-A is transferred to the communication system KS-B as part of a call signaling message SETUP in addition to the traditional subscriber data (e.g. name of the subscriber initiating the call and call number of the subscriber station).

In the following, reference will also be made to some degree to Fig 1.

The communication system KS-B identifies the national language set for the calling terminal device EG-A - referred to in the following as the source language - on the basis of the transferred selector information SI-A. By means of the selector information SI-B, the communication system KS-B identifies the national language set for the called terminal device EG-B - referred to in the following as the target language. If the selector information SI-A is different from the selector information SI-B, the call is automatically routed via a translation device TRSS, TRTT, which performs a translation of a message from the source language into the target language.

If the terminal devices EG-A, EG-B are, for example; digital voice terminal devices between which there exists a connection for the transmission of spoken messages, then an incoming message to the communication system KS-B is forwarded via the switching network SN and the line c to the speech translation device TRSS1, which translates the incoming message from the source language, e.g. German, into the target language, e.g. English, and the translated message is transmitted via the line d and the switching network SN to the called terminal device EG-B. Messages which are then to be transmitted from the called terminal device EG-B to the calling terminal device EG-A are forwarded via the switching network SN and the line d to the speech translation device TRSS1, which translates the message from English into German and transmits the translated message via the line c and the switching network SN to the calling terminal device EG-A.

If the called terminal device EG-B is not available at the time of the call setup, a spoken message is stored together with the transferred selector information SI-A in a personal voice mailbox, from which the message is output on demand by the recipient. The message is forwarded via the switching network SN and the line c to the speech translation device TRSS1, which translates the message from the source language German into the target language English and transmits the translated message via the line d and the switching network SN to the called terminal device EG-B.

If the terminal devices EG-A, EG-B are, for example, fax terminal devices between which there exists a data connection for the transmission of fax messages, then the text portions of an incoming fax message to the communication system KS-B are converted with the aid of a character recognition device (optical character reader) known per se (not shown) into a text format in the source

language. The message is then forwarded via the switching network SN and the line a to the text translation device TRTT1, which translates the text from the source language German into the target language English, and the translated message is transmitted
5 via the line b and the switching network SN to the called terminal device EG-B.

If the called terminal device EG-B is not available at the time of the call setup, the fax message is stored together with the transferred selector information SI-A in a personal fax mailbox. When
10 retrieved by the recipient, the stored message is translated as described and transmitted to the called terminal device EG-B.

If the terminal devices EG-A, EG-B are, for example, multifunctional terminal devices between which there exists a data connection for the transmission of electronic mail (e-mail), then the message to be translated is forwarded via the switching network SN and the line a to the text translation device TRTT1, which translates the message from the source language German into the target
15 language English, and the translated message is transmitted via the line b and the switching network SN to the called terminal device EG-B. If the called terminal device EG-B is not available at the time of the call setup, an incoming message is stored together with the transferred selector information SI-A in a personal text
20 mailbox. When retrieved by the recipient, the stored message is translated by the text translation device TRTT1 as described and transmitted to the called terminal device EG-B.
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The user is offered the option of deactivating the automatic translation. For this purpose, in the case of a voice terminal device there is offered for the display user interface DBO a corresponding menu, in which the user can accept or reject the proposed translation before the translation is activated. For a display terminal device, this option is integrated into the display interface used for the various services (e.g. fax service).
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Within the scope of the invention there is provision for the translation of a message not to be performed exclusively by the communication system KS-B to which the called terminal device EG-B is assigned. If the communication system KS-B does not, for example, possess a suitable translation device TRSS, TRTT which executes a translation of a message from the source language into a desired target language, or if the translation device TRSS, TRTT is not available, then the translation can also be performed by the communication system KS-A to which the calling terminal device EG-A is assigned.

Furthermore it is possible that only incoming calls to the communication system KS-B are translated from the source language into the target language. Messages which are transmitted by the called terminal device EG-B to the calling terminal device EG-A are then translated from the target language into the source language by the communication system KS-A.

Within the scope of the invention there is further provision for an automatic translation of a message to be performed also in the context of multimedia service interworking, such as, for example, 'text-to-voice' or 'voice-to-text'.

Claims

1. Method in a communication system for translating messages addressed to a called subscriber into a national language determined
5 by this subscriber,

wherein

for each of the internal subscribers in the communication system (KS), selector information (SI) designating a national language assigned to the individual subscriber is stored,

10 and in the event of a call being set up the selector information (SI-A) of the calling subscriber is compared with the selector information (SI-B) of the called subscriber,

and if there is a difference in the selector information (SI-A, SI-B), a loop-in function is activated automatically, said loop-in
15 function causing a translation device (TRSS, TRTT) to be inserted in the connection.

2. Method according to Claim 1,
characterized in that

20 display texts for a dialog user interface of internal terminal devices (EG) are stored in the communication system (KS) in a plurality of languages.

3. Method according to Claim 2,
25 characterized in that

the selector information is formed as a function of the national language of the display texts selected by a subscriber for the dialog user interface.

4. Method according to one of the preceding claims,
30 characterized in that

in cases in which a calling terminal device (EG-A) and a called terminal device (EG-B) are assigned to different communication systems (KS-A, KS-B), the selector information (SI-A) is transferred from the communication system (KS-A) of the calling terminal device (EG-A) to that of the called terminal device (EG-B)
35 and/or the selector information (SI-B) is transferred from the

communication system (KS-B) of the called terminal device (EG-B) to that of the calling terminal device (EG-A).

5. Method according to Claim 4,

5 characterized in that the selector information (SI-A, SI-B) is transferred as part of a call signaling process (SETUP), in particular as part of an ISDN call signaling process.

10 6. Method according to one of the preceding claims, characterized in that the loop-in function can be deactivated.

7. Method according to one of the preceding claims,
15 characterized in that the message to be translated is a voice message, a facsimile message (fax), a video message or a message for electronic mail (e-mail).

20 8. Arrangement in a communication system for translating messages addressed to a called subscriber into a national language determined by this subscriber, with a text memory (PS) in the communication system (KS) in which there are stored in a plurality of languages display texts for a
25 display user interface of internal terminal devices (EG), and with subscriber line individual memory elements (DS) in the communication system (PBX), in each of which elements selector information (SI) identifying a national language selected for the subscriber line is stored,
30 and with at least one translation device (TRSS) for translating spoken language and/or at least one translation device (TRTT) for translating text, and with a central controller (CC) in the communication system (PBX) for performing one of the methods according to Claims 1 to
35 7.

Fig 1

Fig 2

Fig 2